AL.3.2010-105

University of Alberta Library
0 1620 3415543 0

...d teacher: Use this cover sheet for mailing or faxing.

ASSIGNMENT BOOKLET
SCN2242 Chemistry 20
Module 2 Assignment

FOR STUDENT USE ONLY	
Date Assignment Submitted: _____ Time Spent on Assignment: _____	(If label is missing or incorrect) Student File Number: _____ Module Number: _____

FOR OFFICE USE ONLY

Assigned Teacher: _____

Assignment Grading: _____

Graded by: _____

Date Assignment Received:

Student's Questions and Comments

Apply Module Label Here

Name
Address
Postal Code

Please verify that preprinted label is for correct course and module.

Teacher's Comments

_____
Teacher

INSTRUCTIONS FOR SUBMITTING THIS DISTRIBUTED LEARNING ASSIGNMENT BOOKLET

When you are registered for distributed learning courses, you are expected to regularly submit completed assignments for correction. Try to submit each Assignment Booklet as soon as you complete it. Do not submit more than one Assignment Booklet in one subject at the same time. Before submitting your Assignment Booklet, please check the following:

- Are all the assignments completed? If not, explain why.
- Has your work been reread to ensure accuracy in spelling and details?
- Is the booklet cover filled out and the correct module label attached?

MAILING

1. Do **not** enclose letters with your Assignment Booklets. **Send all letters in a separate envelope.**

2. Put your Assignment Booklet in an envelope and take it to the post office and have it weighed. Attach **sufficient postage** and seal the envelope.

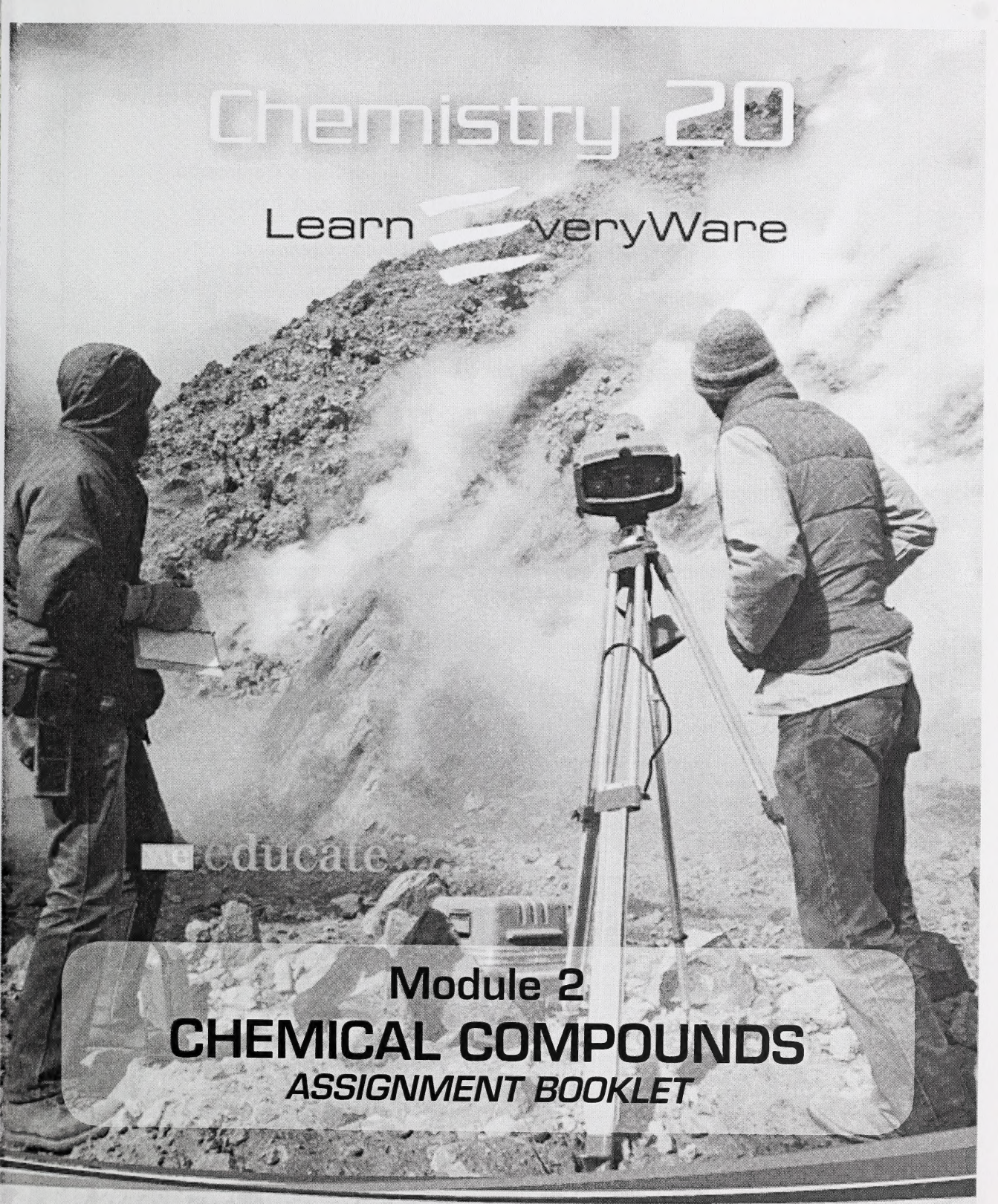
FAXING

1. Assignment Booklets may be faxed to the school with which you are registered. Contact your teacher for the appropriate fax number.

2. All faxing costs are the responsibility of the sender.

E-MAILING

It may be possible to e-mail your completed Assignment Booklet to the school with which you are registered. You also may be **required** to e-mail some of your assignments. Contact your teacher for the appropriate e-mail address.



Module 2
CHEMICAL COMPOUNDS
ASSIGNMENT BOOKLET

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment		
Lesson 2 Assignment		
Lesson 3 Assignment		
Lesson 4 Assignment		

Teacher's Comments

Chemistry 20
Module 2: Chemical Compounds
Assignment Booklet
ISBN 978-0-7741-3037-0

Cover Art: © Photodisc/Getty Images

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	
General Public	
Other	

You may find the following Internet sites useful:

- Alberta Education, **http://www.education.gov.ab.ca**
- Learning Resources Centre, **http://www.lrc.education.gov.ab.ca**
- Tools4Teachers, **http://www.tools4teachers.ca**

Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

Copyright © 2008, Alberta Education. This resource is owned by the Crown in Right of Alberta, as represented by the Minister of Education, Alberta Education, 10155 – 102 Street, Edmonton, Alberta, Canada T5J 4L5. All rights reserved.

This courseware was developed by or for Alberta Education. Third-party content has been identified by a © symbol and/or a credit to the source and must be used as is. This courseware may be reproduced in any form, including photocopying, without the written permission of Alberta Education. Changes can be made only to content owned by Alberta Education. For more detailed information, refer to the Terms of Use Agreement. Every effort has been made to acknowledge the original source and to comply with Canadian copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Education so corrective action can be taken.

THIS COURSEWARE IS NOT SUBJECT TO THE TERMS OF A LICENCE FROM A COLLECTIVE OR LICENSING BODY, SUCH AS ACCESS COPYRIGHT.

UNIVERSITY LIBRARY
UNIVERSITY OF ALBERTA

MODULE 2: LESSON 1 ASSIGNMENT

Lesson 1 Assignment: Bonding Theory and Lewis Formulas

1. Draw the Lewis symbols for the first three elements of group 2 on the periodic table. How are these elements similar?

2. Draw the Lewis symbols for the first three elements of group 17 on the periodic table. How are these elements similar?

3. Draw the Lewis formula and structural diagram for the following molecular elements.

   a. iodine

b. nitrogen

4. Draw the Lewis formula and structural diagram for the following molecular compounds.

a. hydrogen sulfide, H_2S

b. hydrogen cyanide, HCN

c. methanol, CH_4O

5. Identify the central atoms for each of the compounds drawn in question 4 above.

MODULE 2: LESSON 2 ASSIGNMENT

Lesson 2 Assignment: Molecular Shapes and VSEPR Theory

1. For each compound, draw the Lewis formula and stereochemical formula. Identify its VSEPR geometry.

   a. $BeCl_2$

   b. PF_3

   c. BBr_3

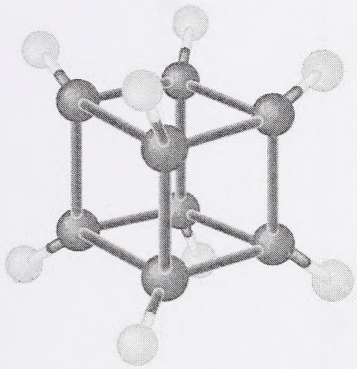
   d. $SiBr_4$

   e. HCN

f. CH_2O

g. CS_2

2. Cubane $C_8H_8(s)$ is a cubic-shaped hydrocarbon with a carbon atom at each corner of the cube.



Cubane is very unstable. Some researchers have been seriously injured when crystals of the compound exploded while being scooped out of a bottle. Not surprisingly, cubane has been the subject of some research as an explosive.

a. According to the VSEPR theory, what should be the shape around each carbon atom? What shape is associated with this bond angle?

b. If you assume an ideal cubic shape, what are the actual bond angles around each carbon?

c. Explain how your answers to questions 2.a. and 2.b. suggest why this molecule is so unstable.

MODULE 2: LESSON 3 ASSIGNMENT

Lesson 3 Assignment: Molecular Polarity

Lab: Evidence for Polar Molecules

Part 1: Pre-Lab

1. Draw stereochemical formulas for the following molecules.

Substance	Water	Pentane	Ethanol	Acetone	Methanol
Chemical Formula	H_2O	C_5H_{12}	C_2H_5OH	CH_3CHOCH_3	CH_3OH
Structural Formula					
Stereochemical Formula					

2. Complete an analysis to predict which substances are polar. Show all your work.

Part 2: Data

3. Use a table to record the data collected from the investigation you completed.

Part 3: Analysis of Data

Complete the following questions. In developing your answers make specific references to your predictions, observations, and other data.

4. Were the predictions you made in Part 1: Pre-Lab above supported by the data collected during your experiment?

5. Suggest an explanation for any of the discrepancies that were observed.

Polar Molecules

6. There are five unknown liquids: A, B, C, D, and E. Each liquid is poured in a thin stream and a charged rod is brought close to each stream. Liquids A, C, and D are attracted to the charged rod; and liquids B and E are not attracted to the charged rod. Which liquids are composed of polar molecules? Explain your answer.

MODULE 2: LESSON 4 ASSIGNMENT

Lesson 4 Assignment: Intermolecular Forces

Part 1: Lab: Boiling Points of Hydrocarbons

a. Place a copy of your data collected for this investigation in the space below.

b. Draw a graph of number of electrons in each compound (horizontal axis) versus boiling temperature (vertical axis).

c. Comment on whether the data when graphed supports the hypothesis stated in the background information section of this investigation.

Part 2

2. Complete Lab Exercise 3. A, "Boiling Points and Intermolecular Forces," on page 110 of your textbook.

   a. Place a copy of your graph here.

   b. Use the graph of the data to demonstrate how the hypotheses describing London forces and dipole-dipole could have been developed and supported by this evidence. Identify where the hypothetical trends are not being demonstrated and which compounds are involved.

3. An antifreeze, or engine coolant, is responsible for transferring heat from the engine by circulating it through the radiator. Antifreeze is a solution containing mainly water and the coolant molecule. The boiling point of antifreeze is much higher than pure water. Consider what you know about chemical structures and intermolecular bonds, and then suggest a reason for this.

4. Complete the following table. The first row has been done for you.

Molecule	Structural	Shape	Polarity	Types of Intermolecular
HBr	H–Br	linear	polar	dipole-dipole
NF_3				
GeH_4				
NI_3				
CF_4				
HF				

5. Three compounds of carbon, hydrogen, and oxygen exist: C_3H_7OH, $C_3H_5(OH)_2$, and $C_3H_6(OH)_3$.

   Rank the three compounds from lowest to highest boiling points using a prediction of the intermolecular forces exhibited by these three compounds. Explain your answer.

6. Given the gases methane, $CH_4(g)$, and sulfur dioxide, $SO_2(g)$, predict which of the two will be more soluble in water. Explain your answer.

Once you have completed all of the questions, submit your work to your teacher.

© 2008